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(54) Beverage dispensing system cleaning apparatus.

(57) A beverage dispensing system cleaning apparatus including, means for selectively supplying cleaning fluid to an inlet (3) of said dispensing system, selectively operable valve means (26) connected with the outlet (25) of said dispensing system, and control means to admit cleaning fluid to said dispensing system and to selectively operate said valve means to effect agitation of the cleaning fluid in said dispensing system.

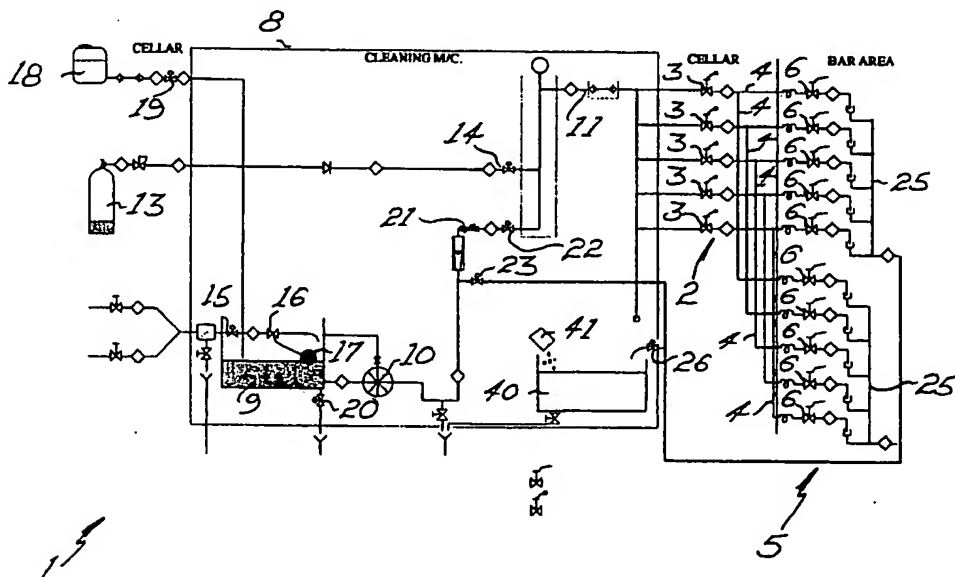


FIG 1

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The present invention relates to beverage dispensing systems and in particular to apparatus for cleaning beer dispensing systems.

The invention has been developed for use with multi keg beer dispensing systems such as those used in large hotels and clubs and will be described with reference to this application.

In the past, beer dispensing systems have been cleaned manually, which is a very slow and labour intensive procedure. For example, a system for a small club operating approximately 10 kegs at one time would need to allow about three hours to manually clean the system. Furthermore, as the cleaning must be conducted outside business hours, penalty wage costs are often incurred with the associated labour.

The existing manual technique essentially comprises the steps of disconnecting the beer lines from the kegs in the cellar and manually flushing the lines with water, cleaning fluid and purging gas. The water is usually passed through the lines under mains pressure or alternatively the cleaning solution is placed in an empty keg and passed through the system using the beer delivery gas. After connection of the water or cleaning fluid the taps are then opened and the flushing medium is usually discharged into buckets which are then repeatedly emptied into the drains.

Not only is the effectiveness of such a system likely to be inconsistent but often the mains water pressure used is not adequate for removing any sludge and deposits that may have built up in the beer lines. This is particularly relevant in large multi storey buildings where the beer lines may extend from a cellar to a bar several floors above.

Due to the magnitude of the manual cleaning exercise regardless of outlet size, it is more likely to be conducted on a weekly or fortnightly basis, which may be less often than would be desirable. Similarly, it may not be unusual for some of the less popular beers to remain stagnant in the lines for extended periods, during which the lines may become warm providing an ideal environment for undesirable bacterial growth.

Other disadvantages with manual systems are the potential dangers associated with using old kegs for storing and dispensing harmful cleaning agents and the need for repeated manhandling of dangerous caustic concentrates and the like.

In view of the potential health risk and the desire to ensure consistent quality of beer dispensed, a beer dispensing system cleaning process needs to be simple to operate, thorough, accurate and foolproof.

It is an aim of the present invention to provide a beverage dispensing system cleaning apparatus which will avoid or at least ameliorate one or more of the above discussed disadvantages of the prior art.

According to the present invention there is provided a beverage dispensing system cleaning apparatus including, means for selectively supplying cleaning fluid to an inlet of said dispensing system, selectively operable valve means connected with the outlet of said dispensing system, and control means to admit cleaning fluid to said dispensing system and to selectively operate said valve means to effect agitation of the cleaning fluid in said dispensing system.

Preferably the system also includes means for selectively and sequentially supplying flushing media such as CO<sub>2</sub> gas and water to the dispensing system to remove any residue of beer or cleaning fluid in the system.

Preferably the cleaning and flushing liquids are supplied from a pressurised fluid source. In one embodiment the fluid is pressurised by means of a pump.

Preferably the sequencing of the valve means is controlled to facilitate pressurising of the cleaning fluid or flushing liquid in the system, particularly during the agitation sequence.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a schematic circuit diagram for the beer dispensing system cleaning apparatus according to the invention.

Figure 2 is a longitudinal sectional view of the body of a beer tap connector according to the invention.

Figure 3 is a locking sleeve forming part of the beer tap connector shown in Figure 2.

Referring to Figure 1 the beer dispensing system 1 includes an inlet 2 in the form of a plurality of beer keg taps 3. A number of beer lines 4 extend from the keg taps 3 to an outlet 5 in the form of a number of bar taps 6 corresponding to the number of beer lines 4.

Connected to the inlet 2 of the beer dispensing system is the cleaning apparatus indicated generally at 8. This cleaning apparatus 8 includes a make up water tank 9 from which the cleaning and flushing fluids, caustic solution and water, are dispensed via a pump 10 and feed line 11 to the dispensing system inlet 2. A relay (not shown) is provided for actuating the pump 10. Also connected to the feed line 11, via a solenoid valve 14, is a cylinder 13 of CO<sub>2</sub>.

Hot and cold water lines connect with the make up tank 9 via a mixer, filter and solenoid valve 15. A limit switch 16 associated with a float 17 is provided within the tank for signalling the solenoid valve 15 to shut when the fluid within the tank reaches a predetermined level.

Also connected via tubing with the tank 9 is a reservoir 18 of caustic cleaning solution which is selectively dispensed via a solenoid valve 19.

A variable restrictor 21, solenoid valve 22 and flow indicator 23 are provided in line intermediate the pump 10 and feed line 11. Also provided in an outlet from the tank 9 is a drain valve 20 through which residual solution can be drained.

A distribution manifold (not shown) is provided between the feed line 11 and the keg taps 3. In a preferred embodiment a loop-type manifold is used to ensure even pressure distribution to each of the keg taps. The bar taps are connected (in banks if convenient) to one or more discharge lines 25 each including a solenoid valve 26.

A waste holding tank 40 is also provided in which the spent caustic can be passivated by the addition of the correct type and amount of acid 41 prior to draining.

The sequencing of the apparatus described is effected by a Programmable Logic Controller (not shown) and where necessary non return valves are provided in the manner well known to those skilled in the art.

The mode of operation of a preferred embodiment of the cleaning apparatus system will now be described with reference to Figure 1. The beer lines 4 are first disconnected from the kegs and connected onto

the beer line cleaning system so as to be in fluid flow communication with the feed line 11. The beer tap drain connectors are then connected, with the beer taps fixed into the open position. The cellarman then presses the system start button and the following steps take place in sequence and automatically.

<u>Step No.</u>	<u>Description</u>	<u>Time/Secs</u>
Step 0	Fill make-up water tank	1/sw
Step 1	Blow lines out with CO <sub>2</sub>	30
Step 2	Wait for lines to settle	30
Step 3	Flush line with water	120
Step 4	Blow lines out with CO <sub>2</sub>	60
Step 5	Drain make-up water tank	1/sw
Step 6	Add caustic to tank	1/sw
Step 7	Fill make-up water tank	1/sw
Step 8	Wash lines with detergent	1/sw
Step 9	Pulse lines with detergent	600
Step 10	Drain make-up water tank of caustic solution	1/sw
Step 11	Fill make-up water tank with water	1/sw
Step 12	Flush lines with water	900
Step 13	Blow lines dry with CO <sub>2</sub> and drain make-up water tank	60
Step 14	Drain make-up water tank	1/sw
	1/sw (limit switch).	

The sequencing of step 9 allows intermittent pressurising and depressurising of the cleaning fluid in the lines 4 by pulsing the solenoid valves 22 and 26. This process has shown to be extremely effective at removing built up residues in the lines.

In other embodiments CO<sub>2</sub> gas is injected into the cleaning fluid in the line as an additional means to effect agitation. The gas injection can be unidirectional or bi-directional, whichever is most effective.

Referring finally to Figures 2 and 3 there is shown one embodiment of the tap connectors suitable for use with the system of the present invention. This connector is designed for connection to the existing kind of beer taps commonly used in pubs and clubs.

The connector 30 comprises a flushing sleeve 31 in which is located a silicone seat 32 that provides a seal with the outlet of the beer tap. The seat 32 is retained by means of a screw cap 33 having an externally threaded spigot 34 to which a drain hose to the discharge line 25 is connected.

When assembled, the locking sleeve 35 shown in Figure 3 is held captive about the sleeve by the screw cap 33. In use, the connector slides up over the tap (not shown) which has an operating lever substantially in the form of a bar extending transversely from the tap outlet. The locking sleeve is aligned to pass over the tap connection bar, then rotated to lock as a bayonet-type fastener, holding the tap outlet in sealing engagement with the seat 32. The connector is configured so that connection can only be effected with the tap in the open position. Unfortunately, the taps are not standard throughout the industry and there are a wide variety of sizes and shapes currently in use.

In another embodiment, the current beer taps are replaced with specifically designed multi-position taps that have a cleaning cycle position permanently connected to the discharge lines 25. In this way the set-up time for running the cleaning system can be dramatically reduced. With multiposition taps it is of course essential that the taps include appropriate "block and bleed" features to ensure that it would not be possible for the cleaning solution to contaminate the beer supply.

Similarly, in yet another embodiment the PLC is replaced by a purpose built circuit board tailored to suit the particular installation, as the cycle times would be dependent to an extent upon the length of the beer lines etc.

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

#### Claims

1. A beverage dispensing system cleaning apparatus (8) is characterised by means for selectively supplying cleaning fluid to an inlet (2) of said dispensing system, selectively operable valve means (26) connected with the outlet (5) of said dispensing system (1), and control means to admit cleaning fluid to said dispensing system (1) and to operate selectively said valve means (26) to effect agitation of the cleaning fluid in said dispensing system (1).
2. A beverage dispensing system cleaning apparatus according to Claim 1, characterised by means (24, 26) to inject pulses of gas into the cleaning fluid in the system to assist agitation of the cleaning fluid.
3. A beverage dispensing system cleaning apparatus according to Claims 1 or 2, characterised by means for selectively and sequentially supplying flushing media to the dispensing system (1) to remove any residue of beer or cleaning fluid from the system.
4. A beverage dispensing system cleaning apparatus according to Claim 3, characterised in that the flushing media is carbon dioxide gas or water.
5. A beverage dispensing system cleaning apparatus according to any one of Claims 1 to 4, characterised in that the cleaning fluid is supplied under pressure.
6. A beverage dispensing system cleaning apparatus according to Claim 3 or 4, characterised in that the flushing media is supplied under pressure.
7. A beverage dispensing system cleaning apparatus according to any one of Claims 1 to 6, characterised in that the fluid is pressurised by means of a pump (10).
8. A beverage dispensing system cleaning apparatus according to any one of the preceding claims characterised in that the valve means (26) is controlled to facilitate pressurising of the cleaning fluid or flushing liquid in the system, particularly during the agitation sequence.

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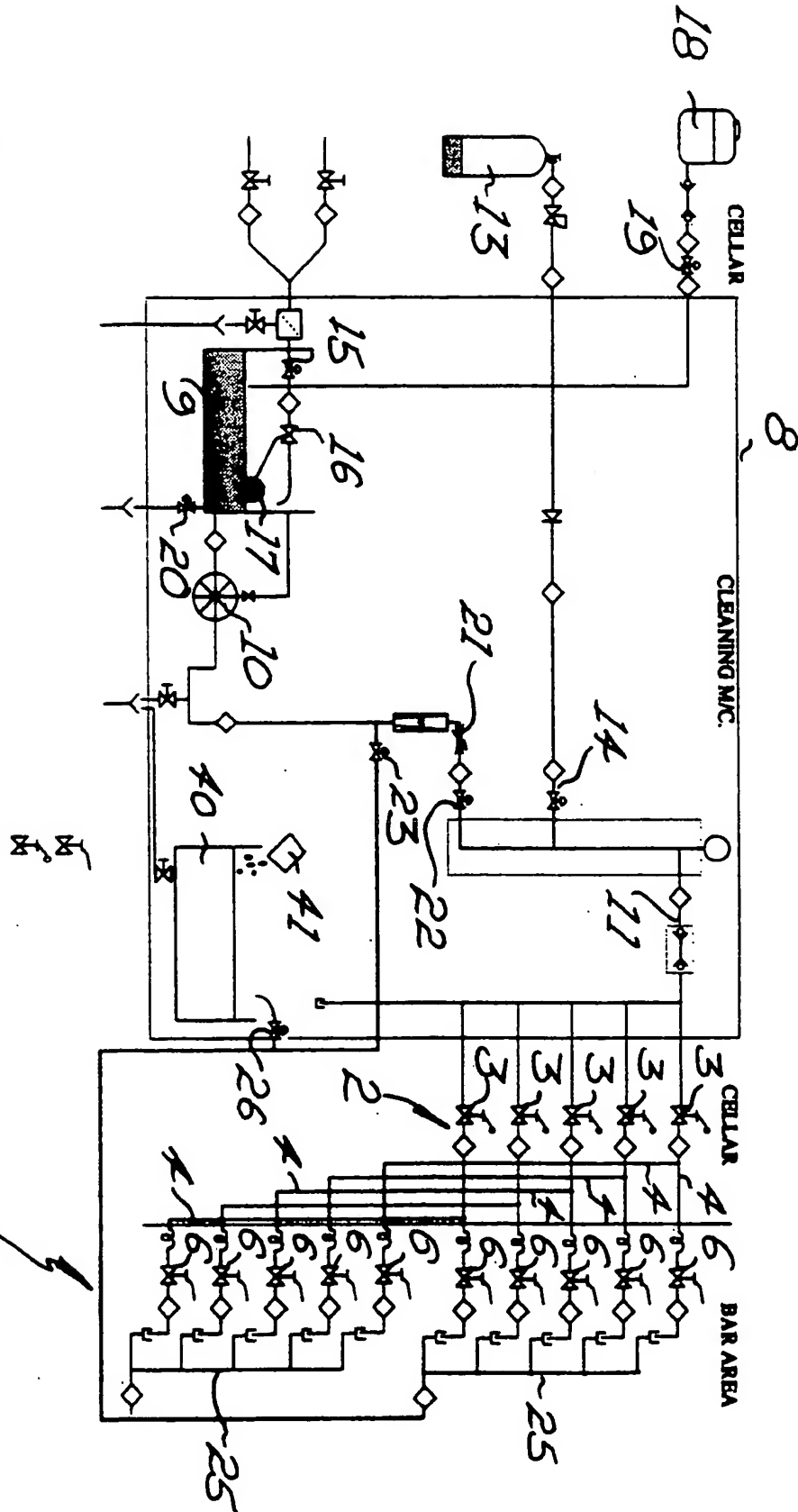


Fig. 1

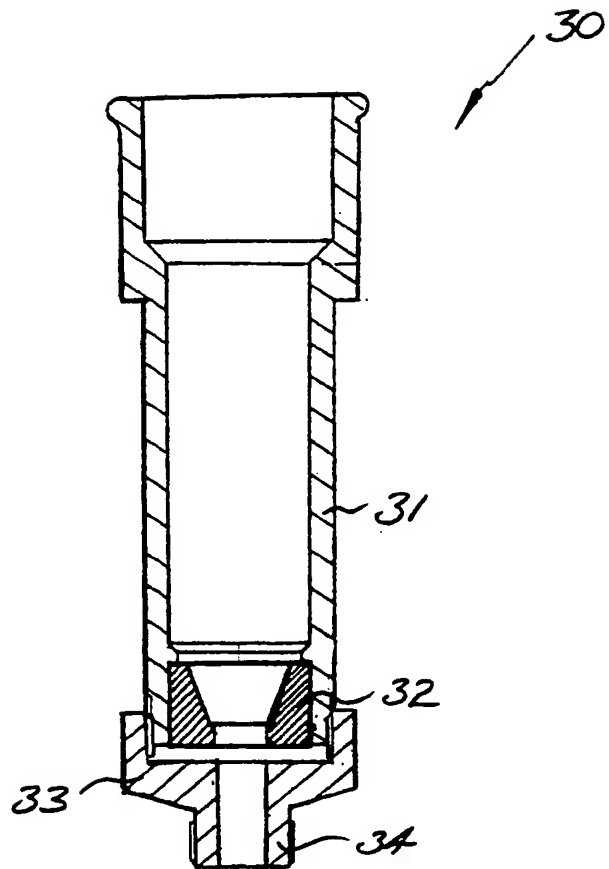


FIG. 2

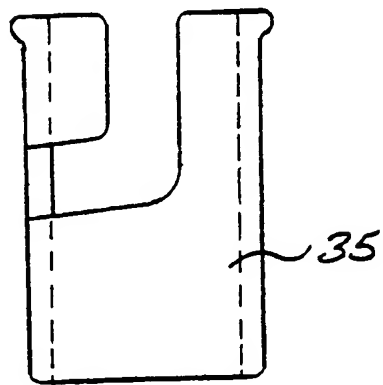


FIG. 3



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## EUROPEAN SEARCH REPORT

Application Number

EP 91 30 9873

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CL.5)
X	FR-A-2 602 571 (BARRIER)	1, 2, 5, 7, 8	B67D1/07 B0889/06
Y	* claims 1-3; figures 1, 2 *	3, 4, 6	
Y	---		
Y	WD-A-8 803 065 (SUNDHOLM)	3, 4, 6	
	* page 7, line 2 - page 8, line 14; figures *		
	---		
A	DE-A-3 539 165 (MANSTEIN)	4	
	* column 2, line 26 - line 43; figures *		
	---		
A	US-A-2 098 525 (SMITH)		
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A	US-A-2 175 951 (BULLERI)		
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			TECHNICAL FIELDS SEARCHED (Int. CL.5)
			B67D B088
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 FEBRUARY 1992	Examiner DEUTSCH J. P. M.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- A : member of the same patent family, corresponding document	
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